

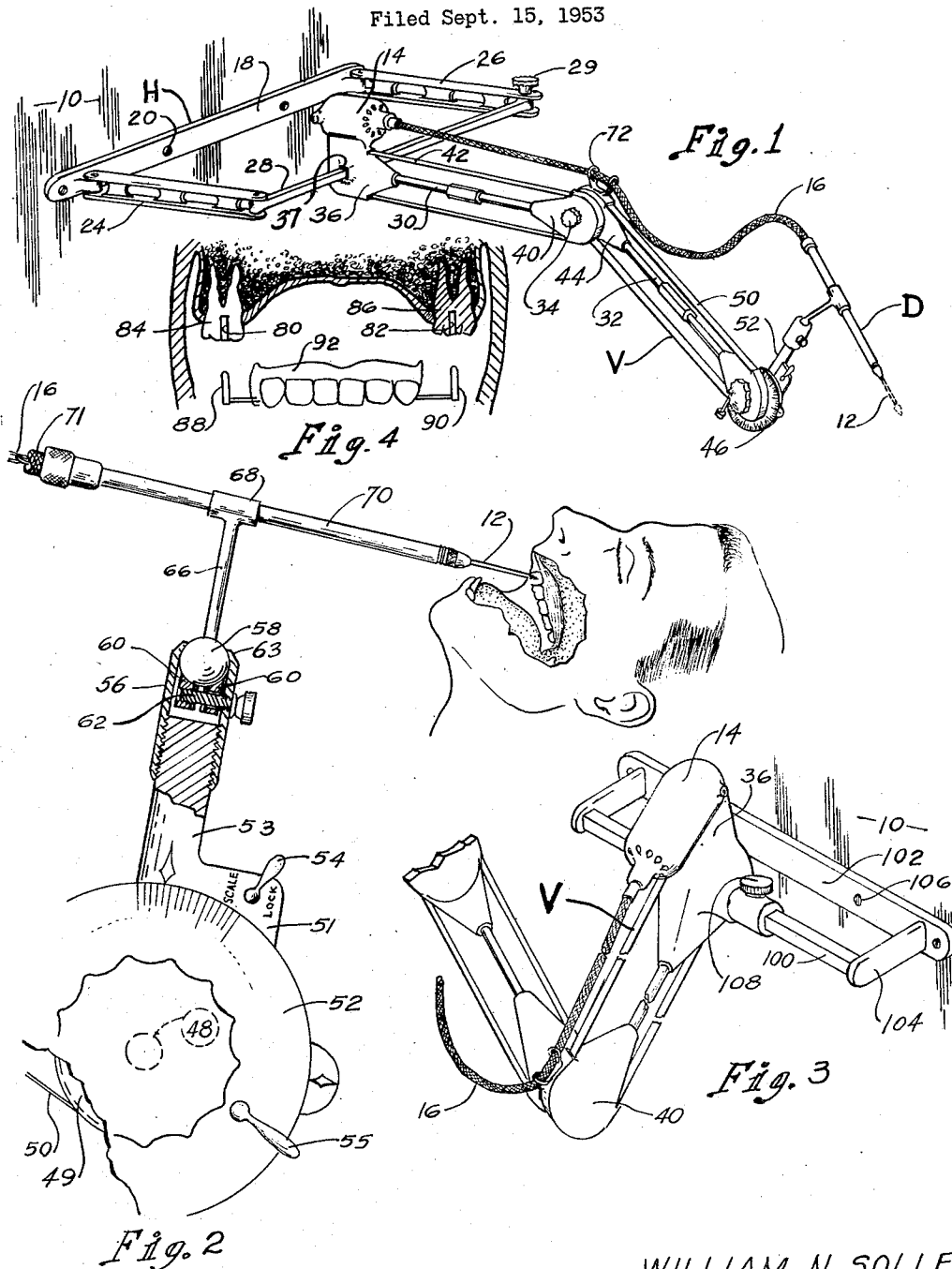
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SUPPORT FOR A DENTAL DRILL

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SUPPORT FOR A DENTAL DRILL

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The present invention relates generally to the field of dentistry, and more particularly to a novel support for a dental drill.

In the practice of dentistry it is sometimes necessary to drill two or more parallel holes in spaced-apart teeth. One example occurs where a bridge is to be anchored between two spaced-apart teeth. The bridge is generally supported between these spaced-apart teeth by a pair of parallel pins, which pins are inserted within two holes formed in the teeth. Heretofore there has not been provided a satisfactory apparatus for drilling the two holes in exact parallelism. Accordingly, the dentist, using a conventional handpiece generally relies upon his naked eye for making such bores parallel to each other. More often than not, these bores are not actually parallel, and accordingly the bridge-anchoring pins must be bent at different angles relative to each other in order that they may be inserted within the two holes. Bending these anchor pins to the required angles must be done by the trial and error method and involves considerable time and effort on the part of the dentist.

It is a major object of the present invention to provide an improved support for a dental drill which permits the drill to be utilized in drilling parallel holes.

A further object of the invention is to provide a support for a dental drill that is adapted to positively support said drill at a desired angle relative to a patient's mouth whereby a plurality of parallel holes may be drilled in spaced-apart teeth of said patient.

Another object is to provide a support of the aforescribed nature which is simple and foolproof in operation.

It is a yet further object of the invention to provide a support of the aforescribed nature which is simple of design and rugged of construction whereby it may afford a long and useful service life.

An additional object is to provide a support for a dental drill which does not require any special training on the part of a dentist to become proficient in its use.

These and other objects and advantages of the present invention will become apparent from the following detailed description, when taken in conjunction with the appended drawings wherein:

Figure 1 is a perspective view of a preferred form of a support for a dental drill embodying the present invention;

Figure 2 is an enlarged fragmentary side elevational view of the support, taken partly in section;

Figure 3 is a fragmentary perspective view of a modification of said support; and

Figure 4 is a vertical sectional view showing how a dental bridge is mounted by bores formed with the use of said support.

Referring to the drawings, and particularly Figures 1 and 2 thereof, the preferred form of support for a dental drill embodying the present invention broadly comprises a horizontally-disposed parallelogram mechanism H mounted to a fixed point such as a wall 10; a vertically-disposed parallelogram mechanism V attached at one of

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its ends to the opposite side of the horizontally-disposed parallelogram mechanism H; and a dental drill D mounted by the free end of the vertically-disposed parallelogram mechanism V for universal movement relative thereto.

5 The bit or burr 12 of the dental drill D is adapted to be rotated by an electric motor 14 mounted by the horizontally-disposed parallelogram mechanism H through a flexible conductor 16.

More particularly, the horizontally-disposed parallelogram mechanism H includes a rear leg 18 which is shown rigidly secured to the wall 10 by screws or bolts 20. The ends of the rear leg 18 are pivotally connected to the rear ends of a pair of side legs 24 and 26. The front ends of these side legs are in turn pivotally connected to the ends of a front leg 28. With this arrangement the front leg 28 will constantly remain parallel to the rear leg 18 during horizontal movement of the front leg relative to the rear leg. A set screw 29 may be provided for locking the legs against relative movement if desired.

10 The vertically-disposed parallelogram mechanism V may be similar in construction to the so-called "drafting machines" which are utilized extensively in the field of drafting for maintaining a straight edge parallel with the upper or lower edge of a drafting board. This mechanism includes a rear arm 30 and a forearm 32, which arms are pivotally interconnected at their adjoining ends by a pivot pin 34. The rear end of the rear arm 30 is rigidly secured to a mounting element 36 of generally hollow configuration. The mounting element 36 is journaled by a bushing 37, which bushing is keyed to the intermediate portion of the front leg 28 of the horizontally disposed parallelogram mechanism H. The electric motor 14 is affixed to the upper portion of the mounting element 36. A fixed pulley (not shown) is keyed to the bushing 37 within the confines of the mounting element. The front end of the rear arm mounts a bushing element 40 of generally hollow configuration wherein is journaled one side of the pivot pin 34. This pivot pin is keyed to a second pulley (not shown) that is encompassed by the bushing element 40. This pulley and the pulley disposed within the mounting element 36 are connected by a continuous band 42.

15 The rear end of the forearm 32 rigidly mounts a bushing element 44 wherein is rotatably journaled the portion of the pivot pin 34 not disposed within the bushing element 40. The front end of the forearm 32 likewise mounts another bushing element 46 wherein is journaled another pivot pin 48. The latter pivot pin journals a pulley 49 encompassed by the bushing element 46 (not shown). This pulley 49 is adapted to be connected to the pulley (not shown) that is keyed to the pivot pin 34 within the bushing element 44 by a second continuous band 50. The pulley 49 journals a scale ring 52 which may conveniently be calibrated in degrees. The pivot pin 48 is keyed to a disk 51 from which a support arm 53 radially extends. The disk and support arm are normally rotatable relative to scale ring 52. Suitable selectively engageable locking means are interposed between the disk 51 and the scale ring 52, however, for locking these elements against relative rotation. Such locking means may be engaged by manipulation of a lever 54. With this arrangement, once the aforementioned locking means has been engaged the support arm 53 will be constantly maintained at the desired angle during vertical manipulation of the free end of the vertically disposed parallelogram mechanism V. Other suitable locking means may be provided for locking the scale ring 52 to the pivot pin 48, which locking means includes a lever 55.

20 Referring now to Figure 2, the free end of the support arm 53 is threadably secured to one end of a cylindrical housing 56. This housing 56 encompasses a ball element 58 and a pair of wedging blocks 60. The wedging blocks

are interconnected by means of a set screw 62 which protrudes from one side of the housing 56. Rotation of this set screw 62 will effect movement of the wedging blocks toward and away from one another. When the wedging blocks are moved toward one another the ball element 58 will be urged against the end of the housing opposite the support arm 53. The frictional engagement of the ball 58 with the frustro-conically shaped inner surface of the housing's end closure 63 will then lock the ball against movement relative to the housing. The ball 58 rigidly mounts a finger 66, which finger is integrally connected to a sleeve 68 at its opposite end. When the set screw 62 is loosened so as to cause movement of the wedging blocks 60 away from one another, the ball element 58 and its fingers 66 will be free to rotate about the axis of this finger. In this manner the angulation of the tube 70 and bit 12 may be varied relative to the support arm 53. Once the desired setting of the tube and bit relative to the support arm has been obtained the ball may be locked relative to the housing 56 by tightening the set screw 62. The sleeve 68 encompasses the intermediate portion of a tube 70. The tube 70 journals a shaft (not shown) to one end of which is secured the bit 12. The opposite end of the shaft is keyed to the conductor 16. The shaft and the bit 12 are adapted to be rotated by means of the flexible conductor 16, which conductor is in turn caused to be rotated by the electric motor 14. The conductor is encompassed by sheathing 71. The sheathing is supported upon the bushing element 44 by a guide 72.

In operation and with particular reference to Figure 4, it may be assumed that a pair of bores 80 and 82 are to be formed in two spaced teeth 84 and 86, respectively, so as to receive a pair of parallel anchor pins 88 and 90 of a bridge 92. The first step in forming the bores 80 and 82 requires that the desired angulation of the bit 12 be adjusted. Such adjustment is obtained by manipulation of the support arm 53 and the tube 70. The set screw 62 and the locking lever 54 are then utilized to lock these members against movement relative to the scale ring 52 and the housing 56, respectively. Thereafter, the first bore 80 will be drilled. Next, the dental drill D is moved horizontally until the bit 12 is adjacent the second tooth 86. During such horizontal movement of the drill B the front leg 28 of the horizontally disposed parallelogram mechanism H will move in a parallel direction relative to its rear leg 18. Such parallel movement will, of course, cause the free ends of the vertically disposed parallelogram mechanism V to be moved toward or away from the wall 10 to a slight distance. Next, the dental drill D will be moved toward or away from the wall 10 whereby the bit 12 may form the second bore 82. During such movement the vertically disposed parallelogram mechanism V will cause the bit 12 to move in exact parallelism with the first bore 80. Accordingly, the bores 80 and 82 will be exactly parallel whereby they may readily receive the parallel anchor pins 88 and 90 of the bridge 92.

In Figure 3 there is shown a modification of the afore-described preferred form of invention. In this modification a horizontally disposed leg 100 is substituted for the horizontally disposed parallelogram mechanism H as a support member for the vertically disposed parallelogram mechanism V. The ends of this horizontal leg 100 are shown rigidly affixed to a plate 102 by means of brackets 104. The plate 102 is secured to the wall 10 by bolts or screws 106. The mounting element 36 of the vertically disposed parallelogram mechanism V is slidably supported by the horizontal leg 100. If desired, a selectively engageable locking mechanism 108 may be provided for locking the mechanism V against movement along the leg 100. The mode of operation of this form of invention is substantially similar to that of the preferred form thereof.

It will be apparent that various modifications and

changes may be made with respect to the foregoing detailed description. For example, it may prove desirable to provide a vertical pivotal connection between the rear arm mounting element 36 and the front leg 28, which connection could be selectively locked so as to facilitate drilling lower teeth. Such changes, however, do not depart from the spirit of the invention or the scope of the following claims.

I claim:

1. A support for a dental drill, comprising: a horizontally disposed support member securable to a fixed point; a vertically disposed parallelogram mechanism attached at one of its ends to said support member; universal joint means on the free end of said vertically disposed parallelogram mechanism, said universal joint means having a movable member which is directly connectible to said dental drill; and, selectively engageable lock means for locking the movable member of said universal joint means at a desired angularity relative to the free end of said parallelogram mechanism.

2. A support for a dental drill, comprising: a horizontally disposed parallelogram mechanism secured at one of its sides to a fixed point; a vertically disposed parallelogram mechanism attached at one of its ends to the opposite side of said horizontally disposed parallelogram mechanism; universal joint means on the free end of said vertically disposed parallelogram mechanism, said universal joint means having a movable member which is directly connectible to said dental drill; and, selectively engageable lock means for locking the movable member of said universal joint means at a desired angularity relative to the free end of said parallelogram mechanism.

3. A support for a dental drill, comprising: a horizontal bar secured to a fixed point; a vertically disposed parallelogram mechanism slidably attached at one of its ends to said bar; universal joint means on the free end of said vertically disposed parallelogram mechanism, said universal joint means having a movable member which is directly connectible to said dental drill; and, selectively engageable lock means for locking the movable member of said universal joint means at a desired angularity relative to the free end of said parallelogram mechanism.

4. A support for a dental drill, comprising: a horizontally disposed support member securable to a fixed point; a vertically disposed parallelogram mechanism attached at one of its ends to said support member; a support arm carried by the free end of said vertically disposed parallelogram mechanism; selectively engageable locking means for adjusting the angularity between said free end and said support arm; means for mounting said dental drill formed on said support arm; and, means to adjust the angularity between said support arm and said drill.

5. A support for a dental drill, comprising: a horizontally disposed support member securable to a fixed point; a vertically disposed parallelogram mechanism attached at one of its ends to said support member; a support arm carried by the free end of said vertically disposed parallelogram mechanism; selectively engageable locking means for adjusting the angularity between said free end and said support arm; a housing mounted by the free end of said support arm; a ball disposed within said housing; a finger formed on said ball and extending from said housing; means to adjust the angularity of said ball relative to said housing; and, means for mounting said dental drill formed on said finger.

6. A support for a dental drill, comprising: a horizontally disposed support member securable to a fixed point; a vertically disposed parallelogram mechanism attached at one of its ends to said support member; a support arm carried by the free end of said vertically disposed parallelogram mechanism; selectively engageable locking means for adjusting the angularity between said free end and said support arm; a housing mounted by the free end of said support arm; a ball disposed within said

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housing; a finger formed on said ball and extending from said housing; wedging blocks disposed within said housing; a set screw interconnecting said blocks, rotation of said set screw causing said blocks to be moved toward and away from one another so as to lock and unlock said ball relative to said housing; and, means for mounting said dental drill formed on said finger.

7. A support for a dental drill, comprising: a horizontally disposed parallelogram mechanism that includes a rear leg attachable to a fixed point, a pair of side legs of equal length pivotally secured at their rear ends to the sides of said rear leg, and a front leg pivotally connected at its ends to the front end of said side leg; a vertically disposed parallelogram mechanism that includes a rear arm and a forearm which are interconnected by a horizontal pivot pin, a mounting element secured to the rear end of said rear arm, a bushing journaling said support element and keyed to said front arm, a fixed pulley keyed to said bushing, a second pulley keyed to said pivot pin, a continuous band connecting said second pulley and said first pulley, a second pivot pin journaled by the front end of said forearm, a third pulley journaled by said second pivot pin; a scale ring carried by said third pulley, a second continuous band connecting said second and third pulleys, a disk carried by said second pivot pin and including a radially extending support arm, selectively engageable locking means between said disk and scale ring that when engaged will maintain said support arm at a desired angle during manipulation of the front end of said forearm; a housing mounted by the free end of said support arm; a ball disposed within said housing; a finger formed on said ball and extending from said housing; wedging blocks disposed within said housing; a set screw interconnecting said blocks, rotation of said set screw causing said blocks to be moved toward and away from one another so as to lock and unlock said ball relative to said housing; a tube rigidly mounted by said finger; a shaft journaled within said tube, said shaft being attachable to a bit at its front end; an electric motor mounted by said mounting element; and, a flexible conductor interconnecting said motor and the rear end of said shaft.

8. A support for a dental drill, comprising: a horizontally disposed support member securable to a fixed point; a vertically disposed parallelogram mechanism that includes a rear arm and a forearm which are interconnected by a horizontal pivot pin, a mounting element secured to the rear end of said rear arm, a bushing journaling said support element and keyed to said horizontally disposed support member; a fixed pulley keyed to said bushing, a second pulley keyed to said pivot pin, a continuous band connecting said second pulley and said first pulley, a second pivot pin journaled by the front end of said forearm, a third pulley journaled by said second pivot pin; a scale ring carried by said third pulley, a sec-

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ond continuous band connecting said second and third pulleys, a disk carried by said second pivot pin and including a radially extending support arm, selectively engageable locking means between said disk and scale ring that when engaged will maintain said support arm at a desired angle during manipulation of the front end of said forearm; a housing mounted by the free end of said support arm; a ball disposed within said housing; a finger formed on said ball and extending from said housing; wedging blocks disposed within said housing; a set screw interconnecting said blocks, rotation of said set screw causing said blocks to be moved toward and away from one another so as to lock and unlock said ball relative to said housing; a tube rigidly mounted by said finger; a shaft journaled within said tube, said shaft being attachable to a bit at its front end; an electric motor mounted by said mounting element; and, a flexible conductor interconnecting said motor and the rear end of said shaft.

9. A support for a dental drill, comprising: a horizontal bar secured at its ends to a fixed point; a vertically disposed parallelogram mechanism that includes a rear arm and a forearm which are interconnected by a horizontal pivot pin, a mounting element secured to the rear end of said rear arm, a bushing journaling said support element and keyed to said horizontal bar for sliding movement therealong; a fixed pulley keyed to said bushing, a second pulley keyed to said pivot pin, a continuous band connecting said second pulley and said first pulley, a second pivot pin journaled by the front end of said forearm, a third pulley journaled by said second pivot pin; a scale ring carried by said third pulley, a second continuous band connecting said second and third pulleys, a disk carried by said second pivot pin and including a radially extending support arm, selectively engageable locking means between said disk and scale ring that when engaged will maintain said support arm at a desired angle during manipulation of the front end of said forearm; a housing mounted by the free end of said support arm; a ball disposed within said housing; a finger formed on said ball and extending from said housing; wedging blocks disposed within said housing; a set screw interconnecting said blocks, rotation of said set screw causing said blocks to be moved toward and away from one another so as to lock and unlock said ball relative to said housing; a tube rigidly mounted by said finger; a shaft journaled within said tube, said shaft being attachable to a bit at its front end; an electric motor mounted by said mounting element; and, a flexible conductor interconnecting said motor and the rear end of said shaft.

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